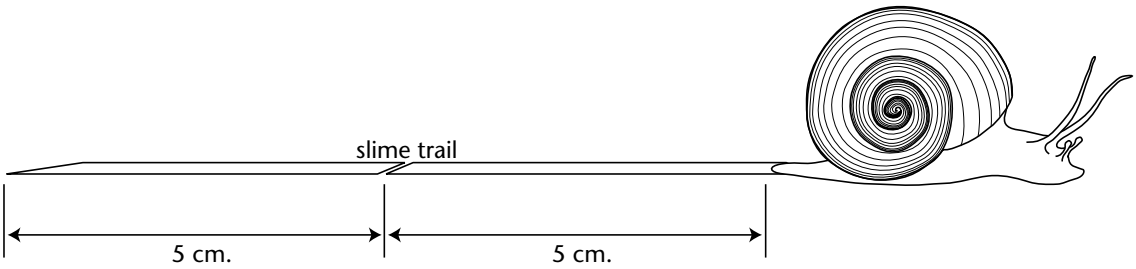
Name _____ Date _____ Class _____

Chapter Project Show Some Motion

Superman is faster than a speeding bullet, but is he as quick as lightning? Just how fast are these things? Have your parents ever accused you of moving like molasses or at a snail's pace? How slow is a snail?

Your goal is to measure the speeds of various things around your home. To measure an object's speed, you need to know how far it moves in a certain amount of time. The snail in the diagram below crawled for 2 minutes to leave the 10-cm slime trail. To calculate the snail's speed, divide the distance (10 cm) by the time (2 minutes) to get 5 cm/min (5 centimeters per minute).



Project Rules

- You must measure the speed of three items in the Speed Choice Menu on the next page. Pick one from each list. If you would like to measure the speed of something not on the lists, ask your teacher for approval.
- For each speed measured, prepare a display card that includes: a title; a diagram of your measurement method; a table of data collected; your step-by-step procedure for calculating speed; and the speeds you calculated.

Suggested Materials

- Things to measure
- A stopwatch or other device to measure seconds and a clock to measure hours, if necessary
- A variety of tools for measuring distances, such as a tape measure, long string or rope with meters marked off, yardstick, or ruler
- Materials to make your display
- Optional: calculator

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Speed Choice Menu

Appetizers	Entrees	Desserts
♦ you walking, running, crawling, or hopping	♦ a toy vehicle moving on a track or across the floor	♦ a point on the rim of your bicycle wheel
♦ a pebble falling in a glass of water	♦ the scent of vanilla moving across a room	♦ the tip of a minute or hour hand
♦ a walking, running, or slithering pet	♦ the rising water level in a bathtub	♦ the growth of grass or other plant
♦ a falling feather, tuft of down, or snowflake?	♦ water moving through a hose	♦ the tip of your dog's wagging tail
	♦ a bird flying by	♦ sound moving across a playground or football field

Project Hints

- Choose a measurement tool based on the distance to be measured. Use a ruler for short distances. Use a meter stick, tape measure, or rope to measure longer distances.
- For distances longer than about 50 meters, you might want to estimate the distance by pacing. Ask your teacher if you need help to estimate a distance.
- Check your math with a calculator.

Project Timeline

Task	Date Due
1. Three speeds chosen.	_____
2. Measurements approved by teacher.	_____
3. Data collected for first measurement.	_____
4. Data collected for second measurement.	_____
5. Data collected for third measurement.	_____
6. Display cards completed for the three measurements.	_____

Name _____ Date _____ Class _____

The Art of Measuring Speed

Measuring More Than Once

1. Keisha wanted to measure the running speed of her dog, Marvin. She marked off 20 meters in her backyard, told Marvin to stay at the starting point, and then positioned herself at the finish point with a stopwatch. She started the stopwatch and called Marvin. Keisha repeated the measurement three more times. Her four measurements were: 5.6 s, 4.3 s, 4.1 s, and 4.4 s.

a. Explain why the first measurement might be so different. Why is it a good idea to repeat a measurement several times?

_____

_____

b. The first measurement was over a second longer than the other three. Give reasons for including and for excluding the first measurement from the average.

_____

_____

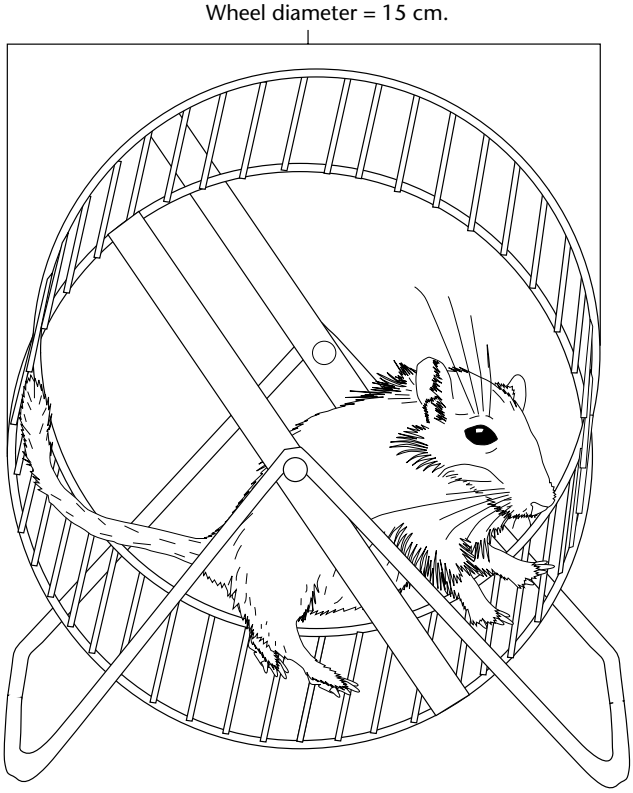
Measuring the Distance Around a Circle

2. Cara's gerbil Clancy was running in a treadmill. Cara remembered that the circumference of a circle is $\pi \times$ the diameter of the circle. ($\pi \approx 3.14$)

a. Calculate how far Clancy runs for each revolution of the treadmill.

_____

b. The radius of a bicycle wheel is 34.5 cm. How far does your bicycle travel for each revolution of the wheel? (*Hint:* The diameter of a circle is equal to twice its radius.)



Name _____ Date _____ Class _____

Lab zone Chapter Project Show Some Motion

In evaluating how well you complete the Chapter Project, your teacher will judge your work in four categories. In each, a 4 is the best rating.

	4	*3*	*2*	*1*
Planning	Designs an efficient and accurate method for measuring distance and time for all three setups.	Designs a reasonable method for measuring distance and time for all three setups.	Designs a method for measuring distance and time for all three setups.	Chooses three speeds to measure. Chooses inappropriate methods to make measurements.
Measuring	All distances are measured accurately. All time measurements are accurate.	Makes one error in measuring. Otherwise, measurements are accurate.	Makes two major errors in measuring.	Makes more than two major errors in measuring.
Calculating	Makes all calculations accurately. Correct units are used throughout the project.	Makes one calculation error and includes correct units most of the time.	Makes two calculation errors. May also omit units or use incorrect units several times.	Makes more than two calculation errors. May omit most units in answers.
Presenting the information	Completes all display cards with title, diagram showing measurement method, data table with proper units, procedure for calculating speed, and speed calculated. Display cards are well organized and easy to read.	Completes all display cards with at least four of the following: title, diagram showing measurement method, data table with proper units, procedure for calculating speed, and speed calculated. May have minor errors.	Completes display cards with at least three of the following: title, diagram showing measurement method, data table with proper units, procedure for calculating speed, and speed calculated. May have errors.	Attempts display cards, but they are incomplete. Display cards may have major errors.